Attitudes toward Fitness Testing among Elite Australian Athletes: Scale Development, Moderating Variables and Associated Risk Factors

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Fitness testing is a regular event for most elite athletes, often occurring many times a year throughout an athletic career. Although many athletes find fitness testing a positive experience, poor results can have significant negative consequences for athletes; ranging from a sense of failure to, in more extreme cases, the loss of a scholarship or a place in the squad. There is anecdotal evidence that some athletes find certain fitness tests, such as skinfold measures and assessment of maximal aerobic capacity, stressful and in a minority of cases this is proposed to lead to pathogenic behaviours such as disordered eating and/or compulsive exercising, with attendant risks to health and well-being. However, worldwide, there is almost no empirical evidence of the attitudes of athletes towards fitness testing or of links between attitudes and risk of pathogenic behaviours. In 2001, the Canadian Academy of Sport Medicine recommended that routine skinfold assessments be abandoned among female athletes; a decision made in the absence of compelling evidence for or against their use. It is apparent that debate and policy decisions about fitness testing should be informed by relevant data. The aims of the present study were (1) to develop and validate a measure to assess attitudes towards fitness testing, (2) to identify personal and situational variables that moderate such attitudes, and (3) to investigate links between attitudes and risk of pathogenic behaviours among elite athletes.

Method

In Study 1, a scale to assess attitudes towards fitness testing was developed from first principles, using methods proposed by DeVellis (1991). Based on discussions with and subsequent review by relevant experts and fitness testing professionals, an initial item pool of more than 100 statements about fitness testing (e.g., "I hate endurance tests", "Body composition tests are vitally important to improving my performance") was reduced to a 24-item scale, that reflected affective, behavioural and cognitive aspects of attitudes (8 items each). Items were oriented toward fitness testing generally, body composition tests, endurance tests, and power tests (6 items each). Twelve items were positively worded and 12 were negatively worded. A 6-point response scale was chosen, anchored by *strongly agree* and *strongly disagree*. The 24-item scale was completed by 269 athletes from the Queensland Academy of Sport (142 males and 127 females). The age range of participants was 13 – 35 years (M = 20.2, SD = 4.1). Twenty sports were represented.

Principal components analysis using varimax rotation clearly identified latent factors for affect (α = .79) and cognition (α = .73) but showed the behavioural scale to be complex (α = .53). Following additional item analyses, the behavioural items were dropped. The remaining 16-item scale (α = .85) produced two viable solutions, a 2-factor solution (affect/cognition) explaining 42.2% of the variance and a 4-factor solution explaining 58.4% of the variance. This second solution comprised four items per scale according to the fitness tests referred to in each item [general (α = .60), body composition (α = .68), endurance (α = .76), power (α = .66)]. Given the strong face validity and the acceptable internal consistencies, factor scores (summed item scores) for both solutions were included in subsequent analyses, along with a total score for the Fitness Testing Attitude Scale (FTAS).

In Study 2, a total of 482 athletes (266 males and 216 females) from the Australian Institute of Sport (n = 175) and seven (of eight) state institutes (n = 298) participated. Nine participants were not associated with national or state institutes of sport. The age range of participants was 12 – 39 years (M = 19.9, SD = 4.2). The majority of athletes (n = 255)

competed at international level, while the remainder competed at national (n = 104), state (n = 101) or regional (n = 21) level. On average, participants had competed for 10.0 years (SD = 4.8) and were fitness tested 3 – 4 times each year, although 50 participants were tested 10 or more times. A total of 40 sports were represented.

All participants completed the FTAS and provided information about themselves and the testing environment. They also completed measures to assess known risk factors associated with pathogenic eating behaviours, including body dissatisfaction, ideal body stereotype, life satisfaction, mood disturbance, perceived sociocultural pressure to be thin, perfectionism, self-esteem, social physique anxiety, and weight loss pressures in their sport. Cronbach alpha coefficients for these measures in the present study ranged from .71 to .93.

Results

Overall, participants tended to report positive attitudes toward fitness testing (see Table 1) although individual differences were substantial and several moderating variables were apparent. Males held more positive attitudes than females, reporting higher FTAS-Total (F = 53.7, p < .001), FTAS-Affect (F = 95.6, p < .001) and FTAS-Cognition scores (F = 9.4, p = .002). Among males, 63.5% reported positive attitudes (as judged by FTAS-Total scores), 31.6% reported neutral attitudes, while only 4.9% reported negative attitudes. For females, the breakdown was 36.1% positive, 44.5% neutral, and 19.4% negative. In general terms, athletes beliefs about fitness tests (e.g., "Generally, fitness tests are necessary for improving performance in my sport") were more positive than their feelings about them (e.g., "By and large, I feel comfortable taking fitness tests"), as reflected by the respective means for FTAS-Cognition and FTAS-Affect. This was especially the case for females. Notably, 41.7% of female athletes reported negative feelings about fitness tests compared to only 9.8% of males.

Table 1. Fitness Testing Attitudes by Gender

	Male (n = 266)		Female (n = 216)		All (N = 482)	
	M	*SD*	*M*	*SD*	*M*	*SD*
FTAS-Total	67.4	10.9	59.5	12.6	63.9	12.3
FTAS-Affect	32.7	6.3	26.6	7.4	29.9	7.5
FTAS-Cognition	34.7	5.7	33.0	6.7	33.9	6.3

Note. $Wilks_{2, 479}$ = .82, p < .001, eta^2 = .19. FTAS-Total scores in the 16 – 48 range reflect negative attitudes, scores in the 49 – 63 range are neutral and scores in the 64 – 96 range reflect positive attitudes. For FTAS-Affect and FTAS-Cognition scores, 8 – 24 is negative, 25 – 31 is neutral, and 32 – 48 is positive.

Using multiple regression analysis, 21% of the variance in FTAS-Total scores could be predicted from athlete characteristics. More positive attitudes were expressed by those who reported they performed better in the endurance and power tests and to a lesser extent the body composition tests, by those who competed at a lower level, and those who had competed for fewer years. Similarly, for FTAS-Affect scores, 23% of variance was explained by the same variables. For FTAS-Cognition scores, 15% of variance was explained by the same variables, except that the consequence of performing poorly in body composition tests was predictive rather than performance itself. Generally, age, frequency of testing, and body mass index were not predictive of attitudes towards fitness testing.

Attitudes towards specific tests are shown in Table 2. Attitudes were most positive towards testing overall, followed by power tests, then body composition tests, with endurance tests receiving the least positive ratings. Significant gender differences were found for all tests. Among males, only 6.0% reported negative attitudes toward fitness testing overall,

7.5% toward power tests, 8.3% toward body composition tests, and 24.1% toward endurance tests, whereas among females the figures were 19.9%, 16.2%, 27.8%, and 45.4% respectively. Attitudes toward specific tests were generally predicted by an athlete's reported record of performance on that test.

Table 2. Attitudes toward Specific Tests by Gender

	Male (n = 266)		Female (n = 216)		All (N = 482)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Body composition	17.0	3.1	14.6	3.7	15.9	3.6
Endurance	15.3	4.0	13.4	4.7	14.5	4.4
Power	17.3	3.5	15.8	3.6	16.6	3.6
General	17.8	3.3	15.7	3.7	16.9	3.6

Note. $\text{Wilks}_{4, 477} = .88$, $p < .001$, $\text{eta}^2 = .13$. Scores in the 4 – 12 range reflect negative attitudes, scores in the 13 – 15 range are neutral and scores in the 16 – 24 range reflect positive attitudes.

Type of sport differences were found between team sports (e.g., basketball, cricket, hockey, netball, rugby, soccer, volleyball), sports that particularly emphasise fitness (e.g., cycling, rowing, swimming, triathlon), those that traditionally do not (e.g., archery, lawn bowls, shooting, tenpin), and aesthetic sports (e.g., diving, figure skating). Unsurprisingly, attitude scores were significantly higher among sports that emphasise fitness compared to other types of sports. Among sports that traditionally have *not* emphasised fitness, FTAS-Cognition scores were significantly lower than for other sports. An interaction effect between type of sport and gender was evident, whereby males and females in the *fitness* sports reported essentially the same attitudes, whereas male and female attitudes diverged in other types of sports.

Clear links between attitudes and risk factors were apparent. Negative attitudes were significantly associated with low self-esteem and life satisfaction, negative mood, and high body dissatisfaction, perceived pressure to be thin, perfectionism, social physique anxiety and weight loss pressures in their sport. For FTAS-Total scores, 30% of variance was predicted from risk factors, especially social physique anxiety, low vigour, high tension, and perceived pressure to be thin. For FTAS-Affect, the variance predicted rose to 39.3% and for FTAS-Cognition it fell to 11.5%. Gender differences in predictor variables were found. Among males, attitude scores were predicted by social physique anxiety, self-esteem, vigour and perfectionism scores, whereas among females the best predictor was tension scores.

Conclusions

The findings suggest at least three things. First, the FTAS may prove a useful measure for future research in this area. Second, the majority of elite Australian athletes hold positive attitudes towards fitness testing – less so for endurance tests – although attitudes are moderated by gender, type of sport, test performance, competition level, and years of competing. Widespread negative attitudes toward body composition tests were not evident. Third, attitudes and risk of pathogenic behaviours are related, although the direction of the relationship is not known. This link warrants further investigation.

References

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